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Some perspectives on musical gift and musical intelligence

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This article examines the debate over issues of musical intelligence, largely in a Scottish context, although it draws on recent international research in its discussion. It examines different perceptions of musical gift, and will relate these to factors which either release it, or constrict the release in different ways. Musical intelligence is then examined within the context of the multiple intelligences proposed by Howard Gardner, and is related to practical aspects of musical education.

Introduction

> I know that we can produce a society where man will cease simply to go to work and have a little leisure, but will release his latent talent and ability and begin to produce in the cultural sense, all of the things I know he is capable of: music, poetry, writing, sculpture, whole works of art that, at the moment, lie dormant simply because we, as a society, are not able to tap into it.

When Arthur Scargill made these remarks during an interview on the BBC's *Person to Person* in 1979 he was not merely arguing for a restructuring of society along less work-oriented lines, but also putting forward a vision of the innate artistic and aesthetic nature of humankind which, he felt, was being wasted in industrial society. In so doing, he was engaging in a debate which has been going on for some time: is giftedness innate in all of us and simply unrealised in the majority, or is it something which is possessed only by an elite few?

Musical intelligence

There are several ways in which we can look at the concept of musical intelligence, which we define as the capacity to engage with and respond to music at a personal level. One of these is to observe it from the psychological standpoint, and a great deal of work has been done in this connection, much of it recently. Handbooks on perception (e.g. Schiffman, 2000) deal with the topic in terms of how sound is perceived and organised and, to a lesser extent, with the effects that it may have upon us. Another might be to look at the concept from the emotional/affective point of view and to assess the impact that music has upon us (Robertson, 2000). A third might be to approach the topic through a study of the curriculum and to examine the ways in which that has developed. Stephanie Pitts has made a recent contribution in this field (Pitts, 2000), although, regrettably, her use of the term 'British' excludes any developments in Scotland. A fourth perspective might be to examine the growth and development of musical ability, as in Swanwick & Tillman (1986) or Swanwick (1988; 1994). A fifth way of looking at this area might be in relation to some interesting

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new developments in the use of music to foster learning in other areas, such as mathematics and language (e.g. Weber, Spychiger & Patry, 1993). This might be referred to as the metacognitive way in which music affects us, apparently increasing our ability to learn. Suffusing all this there is the vast increase in our knowledge of how we learn in general through advances in cognitive neuroscience and neuropsychology. For example, musical ability was once thought to reside primarily in the right, emotional, side of the brain, but recent research has shown both hemispheres to be involved in processing musical thinking (e.g. Schlaug *et al.*, 1995). Indeed, some studies (e.g. Fox, Parsons & Hodges, 2001) seem to indicate that music is an activity that involves much more of our brains than we ever thought to be the case. What might appear at first sight to be disappointing, however, is that modern handbooks of cognition (e.g. Medin, Ross & Markman, 2001; Sternberg & Ben-Zeev, 2001) make very little mention of the importance of music, although many of the processes are dealt with. Clearly, there is still some way to go (or perhaps there is still a high degree of scepticism among cognitive psychologists) before the claims for metacognitive and other merits of music as a discipline and as an influence in general learning are more widely recognised. All this activity indicates a greater interest in enhancing and progressing our understanding of music in education than ever before.

Musical gift

Further, there would appear to be a growing and continuing interest in the education of young people gifted in music and in the types of provision made for their education. Of course, many commentators see the debate on musical gift as lying within the domain of a more general debate about the nature of gift and giftedness. For the purposes of this article we use the term 'musical gift' to indicate a situation where receptive, creative, responsive and technical skills are at a highly developed level. One view is that the child who is perceived to be gifted is located at one end of a spectrum of educational needs; at the other end would be those with learning difficulties. Within the context of that more general debate about giftedness, much has been said about the nature of musical ability or musical intelligence. Skinner (1991) perceives musical ability as a continuum. He calls for a rejection of the view that those who are gifted are in some special category which is detectable by tests of creativity, IQ or giftedness checklists. Rather, he believes, an optimistic view of the learner should be taken and assumptions should be made that 95 per cent of children rather than 5 per cent can *become* gifted. This is in contrast to earlier views (e.g. Runyon, 1971; Passow, 1979) which relied on such discrimination, and which worked from within the orthodoxy that giftedness is the preserve of an elite few. This leads to consideration of the question as to whether or not musical excellence can in fact be taught. Howe (1990) is of the opinion that excellence may depend just as much on opportunities for learning as it does on inherited characteristics or other factors. Davidson, Howe & Sloboda (1997) state:

> The 'gifts' and 'talents' explanation of musical achievement is consistent with the determinist belief that abilities are largely hereditary. In reality, whilst it is true that individual biological differences play a significant role in human development … explaining musical achievement

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only or mainly in terms of 'gifts' and 'talents' denies the many varied and potentially vital environmental influences which affect development.

If musical excellence can be taught, then a number of myths (Sloboda, 1990) need to be addressed and explored. There is the view that to become excellent in music, one has to be excellent to start with. Related to that is the view that if one works hard, this will eventually lead to the attainment of excellence. Allied to these two myths is the perception that musical excellence can be achieved only by those with innate ability, and educationally, training from experienced musicians is an absolute prerequisite. These are Sloboda's (1990) four myths. It is interesting to see that some 11 years later some commentators are stressing them again (cf. Eastop, 2001) almost in their entirety. Clearly this earlier view still has its champions. So it appears that two main views of musical intelligence are operant in the current debate. The first is that musical intelligence is something that is highly developed in a few of us: it is largely seen as innate or inherited. It may be part of an inheritance that is shared by a number of members of a family, who create a context within which it is nurtured (Schwartz, 1975). The second conceptualisation is that it is inherent in all of us, but that it needs to be brought out and developed.

The education of musically gifted children

Within the education system in Scotland there has been a recent trend towards working with children and young people deemed to be musically gifted (SED, 1976). It is interesting to see the two polarities of this debate working themselves out in practice within the pattern of provision for the musically excellent, as evidenced through case studies (McPhee, 2000). On the one hand, there is the conservatoire-based provision available for those who wish to, or are able to, enrol in the Junior School of the Royal Scottish Academy of Music and Drama (RSAMD). This provision is designed as an initial stage for those who will eventually continue their musical careers in an internationally reputable institution, and eventually become professional musicians in their own right. Applicants are required to undergo an audition which involves performing contrasting pieces on the principal instrument and undertaking aural and sight-reading tests. They have to demonstrate that they can benefit from a professional musical training, be prepared to work hard after a normal school week, sort out technical difficulties caused by non-specialist instruction, and be experienced in playing their instrument of choice. Interestingly, they should also possess an indefinable 'spark' (RSAMD, 1998). This system of identification aligns in many respects with the comments made by Eastop (2001).

On the other hand, a comprehensive school in Renfrewshire with a long tradition of music and music-making does not have the same view of musical excellence. Rather, it takes the stance that such excellence is inherent in its pupils, and it makes every effort to realise that talent in a number of ways. First, it uses Bentley tests (Bentley, 1966) and co-ordination tests to establish suitability for musical instruction. Second, it builds upon work begun in the primary schools by instrumental tutors in strings, brass, woodwind and percussion by continuing that musical education in the secondary years, often with the same tutors. Interestingly, it also utilises the skills of senior pupils taught in this way to initiate and bring into the system additional numbers of junior learners. Third, it establishes

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affinity through group instrumental instruction. But last, and most important of all, it provides a huge range of opportunities for solo and ensemble group music-making, often outside the normal school day. By these means it equates the identification of the musically talented with provision for them. This is supported by Janet Mills (1985), who, in agreement with many others, sees the 'best' environment as being one where musical intelligence and excellence may develop, and where all pupils enjoy school music and are motivated to develop their musical awareness, experience and enjoyment.

A third model is that of a specialist music school within a comprehensive environment which can cater for the needs of those who are identified as musically talented. This pattern is found in a small number of special units or music schools throughout Scotland. In some ways, the criteria used to identify prospective students in one such case study school represent an amalgam of the best of both views on musical excellence – or perhaps an uneasy compromise between them, depending upon your point of view. Technique development is looked for in relation to age and stage, not in absolute terms. This may mean that, for example, potential is revealed in a particular affinity with an instrument, an unwillingness to be parted from it, rather than insisting upon a degree of technical development being already there. Second, the ability to communicate music in an effective manner is called for, as is aural perception. Finally, emphasis is placed upon the potential of the candidates to benefit from instruction, both in individual and in group contexts.

What emerges from consideration of these case studies is that the difference between the two views of musical excellence or musical intelligence may be seen to lie in three main areas. First, there is the technical ability of the student. It is interesting that this *can* be seen both in absolute terms and in terms of an incremental scale. On the one hand there is the belief inherent in Sloboda's first myth – which is upheld by Eastop and others – that to become excellent you have to be excellent in the first place; on the other, there is the Howe/Mills view that excellence can be taught and learned by students given appropriate opportunities for this to happen. Second, there is the need to participate – a drive to succeed. Although this becomes the second of Sloboda's four myths, it is nevertheless a view which seems to be shared by all three case study institutions. Third, the ability to sustain effort is seen as important. But this can be dependent upon a whole range of social factors, as we well know. Finally, it is interesting that Sheridan (1999), in reviewing recent developments in the teaching of music in Scottish schools, traces a parallel development from the perception of music as an elitist subject to a position where it is seen as accessible by all potential students and an integral part of the curriculum. One might almost see parallels here between the experiences of the prodigiously gifted Mozart, with his dysfunctional life and the musical inheritance from his father, and that of Vivaldi, who taught the orphans in the Ospedale della Pieta to perform such wonderful musical texts.

Conditions for the achievement of musical excellence

If it is true that musical excellence or intelligence can be taught, it may be possible to identify experiences in life which either enable this excellence to occur, or prevent its occurrence. These experiences we have chosen to describe as '*crystallising*' experiences or '*paralysing*' experiences respectively. A mixed audience of music specialists and other teachers and educationalists at Perspectives on Intelligence: the Conference of the Scottish

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Network for Able Pupils on Friday 23 February 2001 were asked to note down their responses to these two questions: could they describe experiences, which might have happened to themselves or to others that they knew, which either predicated their engagement in music, or which prevented it? The contexts and reasons for the questions were explained, and they were simply given a text box and asked to respond in any way they felt appropriate. The responses were not intensively debriefed at the meeting – though the views of participants were certainly taken account of in discussion, and were only taken for the purposes of this later analysis.

With regard to the 'crystallising' experiences, a number of areas were covered in the responses. These were as follows:

- parents affording opportunities, through instrumental provision and enabling exposure to music in various forms;
- pupils given high self-esteem through reinforcement and praise;
- motivation from a 'gifted' teacher;
- motivation provided by other members of the family, siblings, etc., participating in musical activities;
- motivation from a successful performance in front of an audience;
- working with other musicians at the same and at different stages;
- realising that one has the ability to respond to music.

Of the above, the greatest frequency of response was given to three factors, by a considerable margin. These were:

- motivation through praise and enhancement of self-esteem;
- parental encouragement and support, in various forms;
- inspiration from a gifted teacher or role model.

These seem to us to be important in themselves, but more important as part of a general pattern of positive opportunity. It is perhaps significant that at a time when music, and perhaps the arts as a whole, are under threat from pressures for the raising of standards in what are widely perceived to be the basic skills, that those who felt that they had been able to achieve in music had done so when their opportunities for achievement had been maximised. It is equally significant that no respondent felt naturally gifted, or that musical excellence was in some way pre-ordained. Thus, responses from our admittedly small sample seem to give support to the view that to be excellent in music is dependent on opportunity rather than on inherited characteristics.

When it came to the discussion of 'paralysing' factors, those that militate against the development of musical excellence, the following were the areas suggested:

- being embarrassed in front of a group by poor or inadequate performance;
- ridicule from peers for carrying an instrument/not conforming to the norms of the group;
- poor teaching/boredom from routines/tutors operating deficit models resulting in destruction of confidence;
- a lack of the opportunity to be engaged in musical activity;
- negative comments from tutors when/after playing;

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- negative effects of formal examinations in music and the processes leading to them;
- financial costs of tuition;
- low importance attached to music by the family;
- time required for practice to become proficient;
- pressure to perform to a required standard before confidence had matured;
- inappropriate/boring repertoire;
- ill-informed personal comments by staff.

Again, the most common comments from the group in this category were, by a considerable margin:

- poor/inadequate/inappropriate teaching;
- negative attitudes on the part of teachers, parents and peers;
- lack of opportunities;
- the demands of musical development.

A number of issues arise from consideration of the data obtained from this exercise. First, the number of comments received on 'paralysing' factors outnumbered those on 'crystallising' ones by almost two to one. That is to say, the respondents, i.e. the participants in the conference, had experienced twice as many negative experiences of music as they had positive. This is regrettable, but it may indicate the kind of music tuition that existed in the former, more elitist provision in Scotland that is described by Sheridan (1999). Second, the importance of opportunity is underlined once again. Many of those who had had negative experiences felt that lack of opportunity was a significant factor – they could not afford tuition, the school was not able to provide enough space in its activities for the fostering of music, family attitudes were not favourable. It is significant that just as the provision of opportunity was seen as significant in musical success, so its absence was seen as important in the failure to achieve it. Third, the nature of the learning experience that is provided is critical to success. If positive reinforcement is essential in achievement, so the employment of a deficient model – the perception that there is something wrong with the learner, that she has in some way fallen short of a perception of success or perfection – goes a long way towards destroying confidence and preventing success. There is nothing here that is unique to music: this is true for all learning (e.g. Medin *et al.*, 2001). However, it did seem to assume a high place in the priorities of our sample. The importance of the musical encounter is emphasised by Swanwick (1988; 1994): if this is a negative experience, the student is unlikely to realise her potential. This can also be true not only of teaching, but of the experience of practice and the work perceived to be essential in the achievement of potential (Sloboda, 1990). But the centrality of the teaching/learning interface and the perception of the encounter with music seems to remain the most important factor. This is emphasised in Paynter's (1982) pivotal work on the nature of the curriculum and the musical experience in school:

> Obviously it is not enough simply to plan activities. We have also to motivate pupils, making points of contact to evoke responses and cause learning to take place across the whole ability range. We are unlikely to be successful if we cling to a view of 'musical' and 'non-musical' children. (Paynter, 1982: 53)

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Thus, it appears to us that the nature of the encounter, of the experience mediated by the teacher to the learner, is central to success or the lack of it, if the evidence of our sample is to be believed. But that is not all: there are implications in this for the class, the school and the nature of the learning experiences in music that we offer to our young people. A vast body of advice and regulation has been offered to the music teaching profession from academic, professional and official sources over the years. There has been, both in Scotland and elsewhere in the UK, a trend to make music more accessible, to widen the access of young people to the musical experience and not to restrict participation to those who were already competent in performance (e.g. Scottish Central Committee on Music, 1984). The task of this article is not to repeat this advice, select from it or attempt to expand it: it is simply to point out that if musical excellence is to be fostered, then a number of conditions seem to us to be necessary for this to happen.

First, access and opportunity for musical encounter and experience need to be 'crystallising' rather than 'paralysing' in nature. Second, there needs to be a curriculum which develops a wide variety of metacognitive skills such as experimentation, improvisation, assimilation with the real world, and which fosters motivation. Third, the teaching relationship should be based upon positive reinforcement of achievement rather than the employment of a deficient model. Ability should be nurtured and, through this, exploited at an early stage through the provision of opportunities within and outside the curriculum. Fourth, we need a longitudinal view of musical development that encompasses all the agencies responsible for it: primary and secondary schools; parents and the home environment; private tutors and music centres; and ensemble groups. By means of this holistic approach, a situation is created where there are no barriers to development and where there is a real possibility that development will take place. Such a holistic approach in general is recommended by HM Inspectors in one of the least known but perhaps the most interesting of their publications, *The Education of Able Pupils P6–S2* (HMI, 1993). Further analysis of the conditions under which musical talent may be freed to develop and be nurtured is provided by Sloboda (1990) and Stollery (1997). In addition to the elements that we have identified above, these authors add the early opportunity to experience intense positive emotional or aesthetic states in response to music. Although our respondents did not explicitly indicate this in their written responses, it was clear from the resultant discussion and from other observation that this was felt to be important. For example, when describing the importance of the 'crystallising' experiences, respondents talked of

> . . . greater awareness of musical emotion and enjoyment facilitating other events.
>
> . . . exposure to high quality music early on: realising that one has the ability to respond to music.

These comments seem to us to align our present study with these earlier works and to reinforce their findings, albeit in differing circumstances. This leads us to make two assertions. First, we believe that musical intelligence can be developed in all children. Our experience, and much recent relevant research, indicates this to be the case. Second, it is our view that it is essential that musical intelligence be developed in all children, because there is an increasing body of evidence that other learning may be fostered through it. These comments will now be developed further.

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Music as a gateway to learning

If musical intelligence might be a means to facilitate and develop other learning, the question arises as to whether or not such intelligence is general to all situations or specific to some. It can be seen to be specific in that it is more highly developed in some people than in others, due to genetic or environmental factors (cf. Schwartz, 1975; Swanwick, 1988). Environmental factors might include family circumstances: opportunities provided through families, schools, centres and ensembles for performing, inventing and listening to music. But just as important in our view is Swanwick's point about the importance of cultural issues: not just the surrounding culturescape within which the child is situated, but also the mix of cultures to which the child can be exposed through music transmitted by the media (Swanwick, 1988), and through a curriculum designed to achieve such exposure in a pluralist society. On the other hand, it can be seen to be general in the sense that an increasing body of evidence, perhaps led by the work of Rauscher and by Weber, Spychiger & Patry (1993), suggests to us that there may be a metacognitive dimension to music and that it facilitates learning in other subject areas. Overy (1998) has sparked a considerable debate with her question 'Can music really improve the mind?', with, for example, Weinberger (1999) looking at a wider body of evidence and providing us with not only a contextualisation, but also an answer that is a qualified affirmative. However, Weinberger also points out that we do not understand yet how these transfer effects operate, and that much research into the components of music in both the short and the long term is now needed.

It is our view that musical gift and musical intelligence can be developed within the existing educational infrastructure in Scotland. We cannot at this stage compare this with other systems. Within the Scottish system, two main models appear to operate: curriculum compaction (Farmer, 1996) and enrichment (Atterbury, 1990). These allow musical development in a variety of contexts and have been proven over time to be successful (McPhee, 2000). However, there is now pressure for a variety of sources for achievement and the raising of standards in 'core' subject areas (SOEID, 1998). Schools, under pressure to achieve higher pass rates and standards in literacy and numeracy, are increasingly making use of time after school for extra classes and initiatives in these areas, thus putting added pressure in turn on the global amount of time available for musical activities. This article is not saying that these laudable initiatives to increase literacy and numeracy are wrong; it is, however, saying that they are being undertaken without due consideration being given to the importance of music and the effects that it may have on learners. Schools utilise different models to achieve their ends in core skill initiatives. We simply ask that music be considered as a core skill in itself. Further, there are cultural priorities. These are critical to success in music and in the development of musical intelligence and musical expertise. At the present time, we appear to be seeing a much narrower interpretation of these priorities in response to demands upon the education service from an increasing number of directions. At the moment, a utilitarian philosophy seems to have the upper hand over a wider cultural interpretation of the notion of core skills. For example, the core skills defined within the most recent interpretation of the Scottish curriculum include communication, numeracy, problem-solving, working together, use of information and communications technology and learning and thinking skills (SCCC, 1998). This certainly

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will fit within a definition of core skills which encompasses the majority of those that might be produced by a committee of industrialists assembled to undertake this task, but it would not in any way address a concept of core skills required for living a balanced and fulfilled cultural life. For this, one would require exposure to culture: art, music, literature, sport, and so on. Given the urgency with which local authorities are required by the Central Scottish Executive to address core skills in literacy and numeracy, in particular as a part of government policy, the urgency with which these broader cultural areas might be addressed is bleak by contrast. It is to the great credit of several local authorities in Scotland that they continue to uphold and provide resources for an extended programme of musical enrichment. Clearly there is a demand for this, and a reasonable political payback for providing it.

Music and multiple intelligences

The last task of this article is to relate the concept of musical intelligence to the theory of multiple intelligence proposed by Howard Gardner (Gardner, 1993; 1999). This theory has become well known recently and has found a degree of acceptance to the extent that virtually anyone undertaking a course in psychology or initial teacher education is bound to encounter it at some stage (cf. Wood, 1999). In the initial text, of course, Gardner proposed seven intelligences: these, he said, were specific. It is our view that musical intelligence (one of the original seven) can be shown through research to relate to all the others in some way or other, and we offer examples of studies which seem to us to support this view. The purpose of this is to reinforce our belief that there is a sense in which musical intelligence can be seen to have a dimension that overarches into other learning. Interestingly, Gardner (1993) also pointed out that Western cultures place increased value on logical–mathematical reasoning, whereas other cultures place greater value on other intelligences, such as the kinaesthetic. It is argued that societies rear children in ways that reflect the values they place upon particular intelligences. The importance of this will not be lost upon the reader in the light of some of our previous comments.

Let us first consider language. There might seem to be a self-evident connection between language and music: the whole history of song supports this. Young children use voice and experiment with tone and pitch as they learn to speak. Song is an important part of the nursery teacher's toolkit (e.g. SCCC, 1999). (It is interesting to note that this SCCC document also places great emphasis on the importance of emotional and aesthetic development in general.) However, Willatts & Douglas (1994) also found that there were significant correlations between rhythm performance and both reading and spelling. Further, they found that a six-month programme of music to develop auditory, visual and motor skills in children showed significantly improved reading compared with children in a control group who had a programme of discussion skills, an area which might appear to many observers to be more cognate to linguistic development than music.

There would also appear to be an obvious connection between music and number and mathematics. Understanding and practising music depends on understanding complex relationships of time and pitch and duration. And the research helps us here, too. A study by colleagues of Frances Rauscher (Sarnthein *et al.*, 1997) found in an investigation of spatio-temporal reasoning that students with keyboard training performed better in this

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respect than a computer-activity control group. This line of research has been expanded to investigate the effects of such training on mathematical concepts and problems which presented difficulty in learning. Graziano, Peterson & Shaw (1999) found that second-graders who had keyboard training did better in tests in mathematics than a control group who did not. This tends to support the view that musical keyboard training produces transfer effects (see also Overy, 1998; Weinberger, 1999) which assist specific types of mathematical reasoning.

Mention of Rauscher's 1997 research takes us on to consideration of the spatial. It is in this field that Rauscher has worked, and it is possibly from her work that the famous 'Mozart effect' has been drawn (e.g. Rauscher, 1998). Early studies (Rauscher *et al.*, 1993) indicated that there was a significant, though brief, improvement in spatial tasks when Mozart tapes were listened to as compared to silence or a relaxation tape. A subsequent study (Rauscher *et al.*, 1995) explored the basis of this phenomenon and looked at whether the gain was short or long term. More recently, research has argued (Rauscher & Zupan, 2000) that keyboard instruction in the classroom with kindergarten children not only has a beneficial effect on spatial-temporal performance, but that after time the difference between the control and experimental groups was greater. Moreover, this study supports others carried out in different settings. A body of emerging evidence suggests that there is indeed a case for saying that music has demonstrable relationships with spatial intelligence.

Where bodily/kinaesthetic intelligence is concerned, once again one might think that the case for a relationship between music and this intelligence is self-evident. Gardner himself illustrates the cultural priority attached to dance – and thus the bodily kinaesthetic domain – by, for example, Balinese culture; and one can think of others for which this is also true. It is hard to imagine dance without music, although there are, of course, other movement occasions, such as sport, where music is linked less intimately. But here the research can help us, too. For example, Elbert *et al.* (1995) found that string players showed that years of practice had built up new circuitry in the brain so that the touch centres in the left brain were normal, but those in the right brain, which control the left or fingering hand, were developed to a much greater extent. Again there was an age factor: the starting age was more important in building up these circuits than the extent to which practice was undertaken. This example seems to show that musical activity can affect structurally our ability to undertake particular movements.

We move now into the area of intrapersonal and interpersonal intelligences. In the area of intrapersonal intelligence, it seems that there is a growing body of evidence to suggest that music, or appropriate music, may have a calming effect on people. Interestingly, this calming effect is noticeable on newborn children (Caine, 1991). There are many studies indicating that music can have a beneficial effect in pain relief and in surgery. It is relatively common for patients about to undergo an operation to have calming music available as they go into anaesthesia; and indeed for music to be played for the team while the procedure is carried out. This suggests that there is a relationship between music and an awareness of oneself, the state in which one finds oneself. As a result of this, a whole industry has sprung up offering tapes and other products which are 'guaranteed' to produce relaxation and other pleasurable effects, including enhancement of learning (e.g. Lifetools, Masterworks for Relaxation, etc.). One of the authors of this study has observed

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the use of music in a primary one class in Orebro, Sweden, where children were played Bach as an introduction to the school day. Coming in from the playground, they were excited and effervescent, as one might expect, but what was remarkable was the intent way in which they listened and responded with their thoughts. Music was used both as a control mechanism and as an intense way to prepare the children for the challenges of the day.

In interpersonal intelligence, again the folk perception might be that music compels participation with others when it is undertaken in the context of an ensemble. Here, there is an obligation to take account of others' parts, to listen for leads and responses, to work and practise together for the production of the piece. Ensemble playing obliges social participation. But here too there is research evidence. Maria Spychiger (1998), commenting on the earlier study 'Music Makes the School' in which she was involved, accepts the premise that music in school does give stimulus to other school subjects. But she is equally clear that the improvements in performance in language that were noted in the earlier work might well be attributable to a better, less competitive climate engendered by the increased use of music in the experimental group. She is also clear that not just any musical activity will produced enhanced learning in other areas and that the quality of the teacher is an important variable. Interestingly for this discussion, Spychiger also links musical intelligence to the other areas that Gardner lists, with the comment that '... they are of course connected to each other in many ways' – which has formed the basis of the last part of this article.

Conclusion

It is our belief that music has both extrinsic and intrinsic value in the school curriculum, and that research evidence supports this view. A common perception of music in the curriculum sees it as being arrayed along a spectrum of skills and activities which include the three dimensions of performing, creating or inventing and listening and communicating. Each of these dimensions places obligations upon the teacher to maximise and optimise pupils' participation and to achieve a situation where musical intelligence and musical gifts are fostered and allowed to develop. In performing, pupils' knowledge of instruments should be widened through more active listening and response to that listening. Pupils should be given more opportunities to try out different instruments for themselves. They should be encouraged, if they already play instruments, to use them in class music-making sessions as a matter of course, rather than merely on special occasions. In inventing or creating, they should be set projects that allow them to exploit their imagination and experience more fully. They should be involved in activities that allow them to respond to a greater extent at their own level of ability. In listening and communicating about music, more emphasis should be placed upon singing, which has been shown to develop aural skills. Children should be exposed to the widest possible variety of musical forms, and thus be allowed to form their own judgements about how they should respond to them. Finally, they should be given opportunities to express themselves coherently about music and to demonstrate their powers of insight.

To many, even in this new age, musical intelligence and musical gift is something you either have or do not have, even though neurological research by such as Schlaug *et al*.

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(1995) has indicated that brain structures can actually be changed by musical experience; and many other studies reveal that exposure to music at a young age is critical to subsequent development. This article has attempted to review some of the ground, to contribute in a small way to the debate, and to point some of the ways forward in practice. Let us conclude, as we began, with a quotation. This time it is from Neil Bell, Director of Music at Broughton High School, Edinburgh, a comprehensive school which specialises in the education of musically gifted children:

> It is entirely feasible to make the necessary provision for extraordinary talent within the framework of an ordinary school. There is no gulf between non-musician and musician, or between musician and 'gifted' musician, unless people manufacture one. (SCCM, 1984)

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